



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

April 24, 2007

Tennessee Valley Authority
ATTN: Mr. Preston D. Swafford, Acting
Chief Nuclear Officer and
Executive Vice President
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000390/2007002 AND 05000391/2007002 AND ANNUAL ASSESSMENT
MEETING SUMMARY

Dear Mr. Swafford:

On March 31, 2007, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Units 1 and 2. The enclosed integrated inspection report documents the inspection results which were discussed on April 2, 2007, with Mr. M. Skaggs and other members of your staff.

This report documents one NRC-identified finding of very low safety significance (Green) which was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Watts Bar facility.

In accordance with 10 *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is

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Sincerely,

/RA/

Malcolm T. Widmann, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos. 50-390, 50-391
License No. NPF-90 and Construction
Permit No. CPPR-92

Enclosure: NRC Inspection Report 05000390/2007002, 05000391/2007002
w/Attachment: Supplemental Information

cc w/encl.: (See page 3)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-390, 50-391

License Nos: NPF-90 and Construction Permit CPPR-92

Report No: 05000390/2007002, 05000391/2007002

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Units 1 and 2

Location: Spring City, TN 37381

Dates: January 1, 2007, through March 31, 2007

Inspectors: J. Bartley, Senior Resident Inspector
M. Pribish, Resident Inspector
R. Chou, Reactor Inspector (Section 4OA5)
S. Sandal, Project Engineer (Section 1R04)

Approved by: Malcolm T. Widmann, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000390/2007-02, 05000391/2007-02; 01/01/2007 - 03/31/2007; Watts Bar Nuclear Plant, Units 1 & 2; Problem Identification and Resolution.

The report covered a three-month period of routine inspection by resident inspectors and announced inspections by a regional reactor inspector and project engineer. One NRC-identified Green finding, which was a non-cited violation (NCV), was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance and an associated non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, was identified by the inspectors. The licensee failed to investigate and correct, in a timely manner, an interlock failure associated with the containment sump to B-train containment spray pump suction flow control valve's control circuit. As a result, the B-train containment spray pump was inoperable in excess of the time limits prescribed by the associated Technical Specification Limiting Condition for Operation. The licensee entered the issue into their corrective action program and repaired the control circuit interlock.

The finding is more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affects the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was determined to be of very low safety significance because the containment spray system's mitigating system function was available from the A-train and the finding was not a contributor to large early release frequency. The cause of the finding is related to the thorough evaluation of identified problems aspect of the problem identification and resolution cross-cutting area, in that, the licensee failed to properly classify, prioritize, and evaluate the condition for impact on equipment operability. (Section 4OA2.2)

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near 100 percent power until January 26 when power was reduced to 40% for maintenance on the main condenser waterbox. Power was returned to 100 percent on January 29 and remained there for the remainder of the inspection period.

Unit 2 remained in a suspended construction status.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed the licensee's response for two systems during a freezing condition on February 5, 2007. The inspectors verified freeze protection features such as heat tracing, space heaters, and weatherized enclosures on the refueling water storage tank and essential raw cooling water piping at the intake pumping structure were installed properly and functioning as specified in 1-PI-OPS-1-FP, "Freeze Protection." In addition, the inspectors verified that required administrative actions, such as monitoring and logging temperatures in various locations, were being completed.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors conducted three equipment alignment partial walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, with the other train or system inoperable or out of service. The inspectors reviewed the functional system descriptions, Updated Final Safety Analysis Report, system operating procedures, and Technical Specifications (TSs) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system.

- Walkdown of 1A centrifugal charging pump, 1A and 1B safety injection pumps while 1B centrifugal charging pump was out of service for seal replacement
- A-train auxiliary feedwater (AFW) system during B-train motor-driven auxiliary feedwater (MDAFW) pump component outage.

- A-train auxiliary air system during emergent work on B-train auxiliary air

b. Findings

No findings of significance were identified.

.2 Semiannual Complete System Walkdown

a. Inspection Scope

The inspectors conducted a detailed walkdown/review of the alignment and condition of the AFW system to verify proper equipment alignment and to identify any discrepancies that could impact the function of the system and increase risk. The inspectors utilized licensee procedures, as well as licensing and design documents, when verifying that the system alignment was correct. During the walkdown, the inspectors also verified, as appropriate, that: (1) valves were correctly positioned and did not exhibit leakage that would impact the function(s) of any valve; (2) electrical power was available as required; (3) major portions of the system and components were correctly labeled, cooled, ventilated, etc.; (4) hangers and supports were correctly installed and functional; (5) essential support systems were operational; (6) ancillary equipment or debris did not interfere with system performance; (7) tagging clearances were appropriate; and (8) valves were locked as required by the licensee's locked valve program. Pending design and equipment issues were reviewed to determine if the identified deficiencies significantly impacted the system's functions. Items included in this review were the operator workaround list, the temporary modification list, system health reports, and outstanding maintenance work requests/work orders (WOs). In addition, the inspectors reviewed the licensee's corrective action program to ensure that the licensee was identifying equipment alignment problems and that they were properly addressed for resolution. Specific documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Protection - Walkdowns

a. Inspection Scope

The inspectors conducted walkdowns of eight areas important to reactor safety, listed below, to verify the licensee's implementation of fire protection requirements as described in the Fire Protection Program, Standard Programs and Processes (SPP)-10.0, "Control of Fire Protection Impairments," SPP-10.10, "Control of Transient Combustibles," and SPP-10.11, "Control of Ignition Sources (Hot Work)." The inspectors evaluated, as appropriate, conditions related to: (1) licensee control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment, and features; and (3) the fire barriers used to prevent fire damage or fire propagation.

- Control room emergency ventilation system
- Vital DC Boardroom I, II, III, IV (4 separate fire areas)
- A 6.9 KV shutdown board room
- B 6.9 KV shutdown board room
- MDAFW pumps/component cooling water system pumps

b. Findings

No findings of significance were identified.

.2 Fire Protection - Drill Observation

On February 21, 2007, the inspectors observed an unannounced fire drill performed at the Unit 2 turbine building main feedwater pumps. The drill was observed to evaluate the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were: (1) specified number of individuals responded; (2) proper wearing of turnout gear; (3) self-contained breathing apparatus available and properly worn and used; (4) control room personnel followed procedures for verification and initiation of response; (5) fire brigade leader exhibited command and had a copy of the pre-fire plan; (6) fire brigade leader maintained control starting at the dress-out area; (7) fire brigade response timely and followed the appropriate access route; (8) control/command set up near the location and communications were established; (9) proper use and layout of fire hoses; (10) fire area entered in a controlled manner; (11) sufficient fire fighting equipment brought to the scene; (12) search for victims and propagation of the fire into other plant areas; (13) effective smoke removal operations simulated; (14) utilization of pre-planned strategies; (15) adherence to the pre-planned drill scenario and drill objectives acceptance criteria were met; and (16) fire fighting equipment returned to a condition of readiness to respond to an actual fire.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed internal flood protection measures for the vital electrical switchgear on 757' and 772' elevations of the auxiliary building. The auxiliary building flood protection features were examined to verify that they were installed and maintained consistent with the plant design basis. The inspectors conducted walkdowns of the auxiliary building to verify the following attributes: (1) sealing of equipment below the flood line, such as electrical conduits; (2) sealing of equipment floor plugs, holes or penetrations in floors and walls between flood areas; (3) common drain system and sumps, including floor drain piping and check valves; (4) the drain system has adequate protection (screens/covers) to prevent debris from disabling the drain system or components in the drain system; and (5) sources of potential internal flooding that were

not analyzed or not adequately maintained, such as failure of high pressure fire protection piping. In addition, the inspectors reviewed the licensee's corrective action program (CAP) to ensure that the licensee was identifying flood-related problems and that they were properly addressed for resolution.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On February 2, 2007, the inspectors observed operators in the plant's simulator during licensed operator annual requalification examinations to verify operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with procedures TRN-1, "Administering Training," and TRN-11.4, "Continuing Training for Licensed Personnel." In addition, the inspectors verified that the training program included risk-significant operator actions, emergency plan implementation, and lessons learned from previous plant experiences. The inspectors also observed a shift crew's response to examination scenario 3-OT-SRT-E1-4, "Loss of coolant accident, pressurizer safety fails open." Documents reviewed are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the two performance-based problems listed below. The focus of the reviews was to assess the effectiveness of maintenance efforts that apply to scoped structures, systems, or components (SSCs) and to verify that the licensee was following the requirements of TI-119, "Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65," and SPP-6.6, "Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65." Reviews focused, as appropriate, on (1) appropriate work practices; (2) identification and resolution of common cause failures; (3) scoping in accordance with 10 CFR 50.65; (4) characterization of reliability issues; (5) charging unavailability time; (6) trending key parameters; (7) 10 CFR 50.65 (a) (1) or (a) (2) classification and reclassification; and (8) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1). Specific documents reviewed are listed in the Attachment to this report.

- Periodic replacement due to failures of the control air quick exhaust valves on the containment purge system isolation valves

- Maintenance Rule a(1) action plan for the main control room chillers including a review of failures in the last two years and implementation of corrective actions

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors evaluated, as appropriate for the four work activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65 (a)(4); SPP-7.0, "Work Control and Outage Management;" SPP-7.1, "Work Control Process;" and TI-124, "Equipment to Plant Risk Matrix."

- Emergent work on the B-train MDAFW pump auxiliary oil pump motor
- Unit 1 737' penetration room cooler maintenance which required entry into Limiting Condition for Operation (LCOs) for multiple systems
- Emergent work on the 1A-A residual heat removal pump (RHR) miniflow indicating switch 1-FIS-74-12-A
- Emergent work on the B-train auxiliary air system

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed five operability evaluations affecting risk-significant mitigating systems, listed below, to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered as compensating measures; (4) whether the compensatory measures, if involved, were in place, would work as intended, and were appropriately controlled; (5) where continued operability was considered unjustified, the impact on TS LCO and the risk significance in accordance with the Significance Determination Process (SDP). The inspectors verified that the operability evaluations were performed in accordance with SPP-3.1, "Corrective Action Program."

- Problem Evaluation Report (PER) 117476, 1B-B essential raw cooling water strainer flush control valve failed to open electrically

- PER 118714, Alternate fire safe shutdown means with MFP Turbine-A high pressure steam stop valve not fully closed
- PER 119186, High pressure fire protection pipe blockage
- PER 119737, RHR miniflow alarm came in repeatedly with the 1A RHR pump in service on miniflow
- PER 120736, Emergency Gas Treatment System manual operator actions required after Phase A signal is reset

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed one permanent plant modification accomplished by WO 06-811007-003, Implementation of Design Change Notice 52011, Install Pressure Air Release Valves on Essential Raw Cooling Water Discharge Headers. The inspectors verified that design change installation controls were adequate; that affected operational procedures and licensing documents were identified and revised accordingly; and that post-maintenance testing and equipment return to service was adequate.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed five post-maintenance test procedures and/or test activities, as appropriate, for selected risk-significant mitigating systems to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform its safety function. The inspectors verified that these activities were performed in accordance with SPP-8.0, "Testing Programs;" SPP-6.3, "Pre-/Post-Maintenance Testing;" and SPP-7.1, "Work Control Process."

- WO 03-016475-010, 1B-B AFW pump circuit breaker HFA relay replacement
- WO 05-816727-000, Spent fuel pool circulation pump B-B rebuild
- WO 05-820916-001, Replace pressure regulators for 1-LCV-3-148A
- WO 07-812568-000, 1A RHR pump miniflow indicating switch operation

- WO 06-813472-000, Disassembly and inspection of A-train control air dryer isolation valves

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors witnessed seven surveillance tests and/or reviewed test data of selected risk-significant SSCs, listed below, to assess, as appropriate, whether: the SSCs met the requirements of the TS; the Updated Final Safety Analysis Report; SPP-8.0, "Testing Programs;" SPP-8.2, "Surveillance Test Program;" and SPP-9.1, "ASME Section XI." The inspectors also determined whether the testing effectively demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions.

- WO 06-813039-000, 0-SI-82-14, 24-hour Load Run Diesel Generator (DG) 1B-B
- WO 06-819154-000, 1-SI-30-26-A, Containment Air Return Fan 1A-A Quarterly Operability Test
- WO 06-815446, 2-SI-211-6-A, Channel Calibration Test on Loss of Voltage Relays for 6.9kv Shutdown Board 2A-A
- WO 06-810486-000, 0-SI-30-7-B, Auxiliary Building Gas Treatment System Pressure Test Train-B
- WO 6-817916-000, 1-SI-30-701, Containment Isolation Valve Local Leak Rate Test Purge Air*
- WO 06-821083-000, 0-SI-82-11-A, Monthly Dg Start and Load Test DG 1A-A
- WO 06-820885-000, 0-SI-67-901-B, Essential Raw Cooling Water Pump E-B and G-B Performance Test**

* This procedure included containment isolation valve testing requirements.

** This procedure included inservice testing requirements.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary plant modifications against the requirements of SPP-9.5, "Temporary Alterations," and SPP-9.4, "10 CFR 50.59 Evaluation of Changes, Test, and Experiments," and verified that the modifications did not affect system operability or availability as described by the TS and Updated Final Safety Analysis Report. In addition, the inspectors verified that the installation of the temporary modification was in accordance with the work package, that adequate

configuration control was in place, procedures and drawings were updated, and post-installation tests verified operability of the affected systems.

- Abnormal Operating Instruction AOI-8 changed to install jumpers for diesel generator exhaust fans on a tornado watch
- Temporary alteration control form 1-07-0002-065, Logic changes associated with the emergency gas treatment system (EGTS) pressure control valves

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

On March 15, 2007, the inspectors observed a licensee-evaluated emergency preparedness drill to verify that the emergency response organization was properly classifying the event in accordance with Emergency Plan Implementing Procedure (EPIP)-1, "Emergency Plan Classification Flowchart," and making accurate and timely notifications and protective action recommendations in accordance with EPIP-2, "Notification of Unusual Event;" EPIP-3, "Alert;" EPIP-4, "Site Area Emergency;" EPIP-5, "General Emergency;" and the Radiological Emergency Plan. In addition, the inspectors verified that licensee evaluators were identifying deficiencies and properly dispositioning performance against the performance indicator criteria in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline."

b. Findings

No findings of significance were identified.

1EP7 Force-on-Force Exercise Evaluation

a. Inspection Scope

On March 21, 2007, the inspectors observed licensee performance during a licensee-evaluated site emergency preparedness drill in the plant's simulator. The inspectors observed communications, event classification, and event notification activities by the shift manager. The inspectors also observed the post-drill critique to determine whether their observations were identified by the licensee evaluators.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verifications

a. Inspection Scope

The inspectors sampled licensee submittals for the three PIs listed below. To verify the accuracy of the PI data reported during the periods listed, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Revision 4, were used to verify the basis in reporting for each data element.

Cornerstone: Initiating Events

- Unplanned Scrams per 7000 Critical Hours (January 1, 2006, to December 31, 2006)
- Scrams with Loss of Normal Heat Removal (January 1, 2006, to December 31, 2006)
- Unplanned Power Changes per 7000 Critical Hours (January 1, 2006, to December 31, 2006)

The inspectors reviewed selected licensee event reports and portions of the operator logs to verify that the licensee had accurately identified the number of scrams and unplanned power changes greater than 20 percent that occurred during the previous four quarters. The inspectors also reviewed the accuracy of the number of critical hours reported and the licensee's basis for crediting normal heat removal capability for each of the reported scrams.

Cornerstone: Barrier Integrity

- Reactor Coolant System Activity (April 1, 2006, to December 31, 2006)

The inspectors reviewed portions of the operator and chemistry logs to verify that the licensee had accurately determined and reported the reactor coolant system maximum dose equivalent iodine-131 activity during the period reviewed.

b. Findings

No findings of significance were identified.

4OA2 Identification & Resolution of Problems

.1 Review of Items Entered into the CAP

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the

licensee's CAP. This review was accomplished by reviewing daily PER summary reports and attending daily PER review meetings.

b. Findings

No findings of significance were identified.

.2 Annual Sample: Missed Opportunity to Identify a Failed Containment Spray Pump Suction Valve

a. Inspection Scope

The inspectors reviewed the licensee's evaluation of a potential missed opportunity to identify a failed containment spray pump suction valve. The inspectors evaluated whether the licensee promptly identified and corrected conditions adverse to quality in accordance with 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." Documents reviewed are listed in the Attachment to this report.

Background

On September 20, 2006, during performance of the 18-month surveillance instruction 1-SI-63-915-A, Safety Injection System - Valve Position Indication Verification and Full Stroke Exercising (Train A), 1-FCV-72-45 could not be opened electrically. Troubleshooting identified that the valve position interlock associated with 1-FCV-72-21 was mis-positioned. Further review by the licensee determined the condition had existed since March 22, 2005. This resulted in the inoperability of the B-train of containment spray system for the entire previous 18-month fuel cycle. The licensee corrected the valve position interlock and initiated PER 111128 to determine the cause of the interlock mis-position. Section 4OA7 of NRC Inspection Report 05000390/2006005; 05000391/2006005 documents the licensee-identified violation.

While performing a historical review on 1-FCV-72-45, the licensee identified that the same valve's control circuit was documented as not functioning during the performance of a separate surveillance instruction on August 26, 2006. On November 15, 2006, the licensee initiated PER 114811 to evaluate whether the surveillance test director or the WO review group had missed an opportunity to realize that the 1-FCV-72-45 test failure on August 26, 2006, indicated a problem in the control circuit for 1-FCV-72-45. On February 14, 2007, PER 114811 was closed by the licensee with the conclusion that there was no missed opportunity by either the test director or the WO review group. This conclusion was based on the licensee's rationale that the surveillance being performed (1-SI-0-53-B) was to test the transfer switch, not the interlock, and it was not a reasonable expectation that the test director would have known that the valve's interlock would not function.

b. Assessment and Observations

The inspectors determined that the licensee's evaluation conducted under PER 114811 failed to identify that the purpose of the August 26, 2006, surveillance instruction was to test both the control circuit and the transfer switch. Additionally, WO 06-818876-000

written to troubleshoot the failure was incorrectly prioritized for a test failure of a safety-related system. The inspectors also determined (after viewing an electrical schematic referenced in 1-SI-0-53-B) that it was readily apparent that several components in the valve's control circuit could have caused the test failure. As a result of the inspector's observations, the licensee initiated PER 121598.

c. Findings

Introduction: A finding of very low safety significance and an associated non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors. Licensee personnel did not generate a PER at the time of the test failure and failed to promptly investigate and correct a control circuit failure revealed during a scheduled surveillance.

Discussion: On August 26, 2006, 1-FCV-72-45, Containment Sump to CS Pump 1B-B Suction Valve, was tested using Section 6.59 of surveillance test 1-SI-0-53-B, 18 Month Verification of Remote Shutdown Transfer Switches for Train B. The purpose of Section 6.59 was to test the remote shutdown transfer switch and associated control circuit for 1-FCV-72-45. As part of the test, the control circuit transfer switch was taken to the "AUX" position and the remote handswitch was taken to the "OPEN" position. The control circuit open contactor failed to energize which was an unexpected condition and a failure of the acceptance criteria for the test. The failure of the contactor to energize was also an indication of a failure or malfunction of one or more components in the valve's control circuit. WO 06-818876-000 was initiated to troubleshoot and repair the transfer switch or the remote handswitch. A PER was not generated for failing the surveillance acceptance criteria and no additional investigation of the condition was conducted at the time.

WO 06-818876-000 was initially given a priority code to be worked within the following 12 weeks, but was later given a priority code to be worked in the refueling outage which started on September 11, 2006. On September 20, 2006, the licensee identified that 1-FCV-72-45 would not open electrically as required for B-train containment spray operability. The licensee later determined that the condition had existed since March 2005 due to an improperly set valve position switch in the control circuit for 1-FCV-72-45.

The inspectors reviewed electrical schematic 1-45W760-72-3 that was referenced in 1-SI-0-53-B and determined that it was readily apparent that there were several components in the valve's circuit that could have caused the test failure. However, further troubleshooting of the circuit was required to determine the failed component(s). Thus, PER 114811 closure on February 14, 2007, with the conclusion that the August 26, 2006, failure was not a missed opportunity, was incorrect.

Analysis: The inspectors determined that the failure to ensure that the control circuit deficiency revealed on August 26, 2006, was investigated in a timely manner was a performance deficiency. The inspectors concluded that the finding was more than minor in accordance with Appendix B, Issue Screening, of IMC 0612, "Power Reactor Inspection Reports," because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone

objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The control circuit for 1-FCV-72-45 was returned to service, after testing, in a condition such that the valve would not have functioned as designed.

The finding affected both the Barrier and Mitigating Systems Cornerstones and therefore required a Phase 2 SDP. The results of the Phase 2 SDP required further evaluation by a regional senior reactor analyst. The regional senior reactor analyst performed an SDP Phase 3 for the finding. The finding was determined to be of very low safety significance because the containment spray system's mitigating system function was available from the A-train components and the finding was not a contributor to large early release frequency. The containment spray system's mitigating system function (refill the refueling water storage tank) was only needed for a small number of low frequency events involving common mode failures of equipment and inability to depressurize the reactor coolant system during small loss of coolant accidents (LOCAs). The senior reactor analyst used the NRC's risk model to extract the high worth sequences for small LOCA and for reactor coolant pump seal LOCA. These sequences were adjusted to allow refill of the refueling water storage tank through the spray system, and the worth of the loss of this function was calculated. Using the maximum exposure time for SDP of one year, the finding was determined to be of very low safety significance, Green. The cause of the finding is related to the thorough evaluation of identified problems aspect of the problem identification and resolution cross-cutting area, in that, the licensee failed to properly classify, prioritize, and evaluate the condition for impact on equipment operability.

Enforcement: 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, defective material and equipment and non-conformances are promptly identified and corrected. Licensee procedure SPP-3.1, Corrective Action Program, required that a PER be initiated for failures of affecting safety-related equipment. Contrary to the above, a PER was not initiated for the control circuit deficiency for 1-FCV-72-45 that was identified during surveillance testing on August 26, 2006. The condition was not promptly corrected until October 2006. Because this finding is of very low safety significance and because it was entered into the licensee's corrective action program as PERs 121598 and 121601, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000390/2007002-01, Failure to Promptly Correct an Identified Equipment Malfunction.

4OA5 Other

Unit 2 Steam Generators (SGs) Startup Status Evaluation with Eddy Current Testing (ET) and Visual Inspection (IP 92050)

a. Inspection Scope

The purpose of this inspection was to observe the licensee conducting ET to determine the condition of four SGs in place for 30 years without operation such that the licensee

could estimate the cost of the repair or replacement of the SGs for a feasibility study of startup for Unit 2.

The inspectors reviewed procedures, ET Bobbin data analyses (no rotating probe performed), documents, equipment qualification, and examiner qualifications and certifications, and also observed ET data acquisition for the primary side and visual/video inspection for the secondary side of the SGs. The inspectors verified that the licensee used the same or generated similar procedures from Unit 1 for this inspection. The inspectors verified that the licensee used qualified techniques, analyses, equipment, and examiners. The inspectors reviewed Bobbin data analyses for six tubes which included two tubes that had 70 percent and 30 percent through-wall degradation. The licensee explained that the identification of the degraded tubes, not identified in the original preservice inspection performed 30 years ago, was due to the evolution of Bobbin techniques. The licensee intends to plug these two tubes during the startup preservice inspection. The inspectors observed that the licensee performed the visual/video inspection for the corrosion and foreign objects in the secondary side of SGs. Evidence of corrosion was observed on the outside walls of tubes, the top of tubesheet, and shell walls up to five inches on the tubes in two SGs and up to one inch on the other two SGs. The corrosion was induced from the top of tubesheet or vessel shell walls and indicated water had remained there for sometime. A significant amount of foreign objects were observed in all SGs. The licensee concluded that no major defects or corrosion were identified except dents, dings, and two through wall degraded tubes in the primary side and some degree of corrosion to be cleaned and foreign objects to be removed in the secondary side. The licensee will perform a preservice inspection for the baseline inspection using Bobbin and Rotating Probes and make other modifications to bring Unit 2 SGs up to the Unit 1 startup standard.

b. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

.1 Integrated Report Exit

The inspectors presented the inspection results to Mr. M. Skaggs and other members of licensee management at the conclusion of the inspection on April 2, 2007. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

.2 Annual Assessment Meeting Summary

Subsequent to the end of this inspection period, on April 9, 2007, the NRC's Chief of Reactor Project's Branch 6 and the Senior Resident Inspector assigned to the Watts Bar Nuclear Plant met with the Tennessee Valley Authority (TVA) to discuss the NRC's Reactor Oversight Process (ROP) and the NRC's annual assessment of Watts Bar safety performance for the period of January through December 2006. The major topics addressed were: the NRC's assessment program, the results of the Watts Bar assessment, and NRC inspection plans. Attendees included Watts Bar site

management and members of site staff. Other attendees included a Tennessee Emergency Management Agency representative; the Emergency Management Directors of Meigs, McMinn, and Rhea Counties; two reporters (Knoxville and Rhea County newspapers); and a member of the public.

This meeting was open to the public. The presentation material used for the discussion and a list of attendees are available from the NRC's document system (ADAMS) as accession number ML071100093 and ML071140269, respectively. ADAMS is accessible from the NRC Web site at <http://www/reading-rm/pdr.html> (the Public Electronic Reading Room).

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

B. Briody, Maintenance and Modifications Manager
D. Feldman, Training Manager
A. Hinson, Site Engineering Manager
J. Hinman, Manager of Projects
M. Lorek, Plant Manager
M. McFadden, Site Nuclear Assurance Manager
P. Sawyer, Radiation Protection Manager
M. Skaggs, Site Vice President
S. Smith, Operations Superintendent
D. White, Operations Manager

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

| | | |
|---------------------|-----|--|
| 05000390/2007002-01 | NCV | Failure to Promptly Correct an Identified Equipment Malfunction (Section 4OA2.2) |
|---------------------|-----|--|

Closed

None

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

- Per 111436, Labeling
- Per 112605, Loop Calibration
- PER 112744, Pressure Regulator 1-PREG-3-174B
- WO 05-820916-001, 1-LCV-003-0148A-B, SG 3 Aux Feedwater
- WO 06-820576-000, 1-PREG-003-0175B, Control N2 Press Reg
- WO 06-820685-000, 1 PREG-003-0174B, Control N2 Press Reg

Section 1R11: Licensed Operator Regualification Program

- PER 90112, Level B PER for the main control room chiller system being classified as Maintenance Rule (a)(1)
- Maintenance Rule expert panel minutes for meeting on December 12, 2005
- FY 2007, Period 1, System Health Report for Systems 30 and 31
- PER 88247, Main control room chiller stopped cooling
- Preventative maintenance 1-LPT-044-0041, Auxiliary Building Heat Temperature Control Loop Inspection

Section 1R12: Maintenance Effectiveness

- Master PM 0799W, Replacement of Quick Exhaust Valves on Containment Purge Isolation Valves
- PER 108634, Corrective maintenance WO PER for Quick Exhaust Valves on Containment Purge Isolation Valves

Section 1R23: Temporary Plant Modifications

- 50.59 Evaluation form for AOI-8, revision 32
- 50.59 Evaluation form for TACF 1-07-0002-065

Section 40A5: Other - Unit 2 Steam Generator Startup Status Evaluation

- WBN Unit 1 Procedure MI-3.015, Steam Generator Secondary Side Maintenance Activities, Rev. 8
- Examination Technique Specification Sheets (ETSS)
- Watts Bar Nuclear plant Unit 2 Steam Generator Status, Dated March 16, 2007
- Watts Bar Nuclear Plant - Unit 2 Steam Generator Eddy Current Examination Guideline, Rev. 0